The social and budgetary impacts of recent social security reform in Belgium

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Gijs Dekkers, Raphaël Desmet, Nicole Fasquelle, Saskia Weemaes, forthcoming, The social and budgetary impacts of recent social security reform in Belgium. In Ioana Salagean, Catalina Lomos & Anne Hartung, *The young and the elderly at risk: Individual outcomes and contemporary policy challenges in European societies*, under final review with Intersentia.

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Summary

This paper discusses the impact of recent social security reform on the development of sustainability as well as adequacy in Belgium. The impact analyses in this paper have been done using two separate yet consistent models. The analysis of the budgetary impact is based on the MALTESE system of models (Model for Analysis of Long-Term Evolution of Social Expenditure). The analysis of the adequacy of the social security reform is done using the most recent version of the dynamic microsimulation model MIDAS (Microsimulation for the Development of Adequacy and Sustainability).

The structural reforms of December 2011 reduce the budgetary cost of ageing by 0.3 percentage point of GDP between 2011 and 2060, evenly distributed between pensions, unemployment and Conventional Early Leavers' Scheme / Unemployment with Company Allowance (CELS/UCA). Besides the direct impact of the measures themselves, the increased GDP resulting from the reform decreases, of course the weight of social expenses in percent of GDP.

The risk of poverty rate of retirees decreases progressively as a result of the reform. In 2060, the reduction should reach 4 percentage points (4 percentage points for men and 5 percentage points for women). Furthermore, the poverty risk of male unemployed, in particular, increases considerably.

Keywords: Social security reform, Belgium, financial sustainability, adequacy, poverty.

1. Introduction

For many western countries including Belgium, population ageing constitutes an important budgetary and social challenge. They are therefore taking measures to deal with the issue. The Belgian governmental agreement of December 2011 included a social security reform which, for certain aspects, came into force in 2012.

The aim of those measures is primarily to strengthen the financial viability or sustainability of the social security system (specifically first-pillar – or legal public pensions), i.e. to reduce its costs in a context of demographic ageing, especially through limiting early retirement. However, such a series of measures inevitably also has consequences on the adequacy of pension benefits in the first pillar[2]. The question then is how important those impacts are.

This paper aims to discuss the impact of the recent social security reform on the development of financial sustainability as well as adequacy in Belgium. The impact analyses in this paper have been done using two separate yet consistent models. The analysis of the budgetary impact of social security reform (pensions, as well as the conventional early leavers' scheme and general unemployment scheme) is based on the MALTESE system of models (Model for Analysis of Long-Term Evolution of Social Expenditure), which is a composition of accounting models used to translate demographic and economic projections into budgetary developments. The analysis of the adequacy of the social security reform is done using the most recent version of the dynamic microsimulation model MIDAS (Microsimulation for the Development of Adequacy and Sustainability)[3]. This model simulates the lives of actual individuals and households in Belgium, starting from a representative administrative sample of about 2.2 million individuals in 2001. A discerning character of MIDAS is that it aligns with the simulation results of MALTESE. Consistency between the two models is achieved through various channels, previously described in Dekkers, Inagaki and Desmet (2012), which will be outlined in section 3.

The paper will report the results of this joint analysis of recent social security reform in Belgium. Thus, the projected budgetary impacts will be discussed along with the impact on the evolutions of the adequacy of pensions and unemployment benefits in Belgium. The former will focus on the labour market, the macro-economic environment and social expenditures. The latter uses social indicators, such as poverty risk and inequality, and (re)distribution indicators for the population as well as for specific groups.

This introduction ends with the discussion of a caveat. Besides the pension reform, the Di Rupo administration also introduced, among others, a reform in the unemployment and career break schemes. For an extended discussion on this matter, we refer to the annual report of the High Council of Finances (2012, pp. 44-46). These reforms, of course, also have their budgetary impact, which will

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[2] Adequacy can be defined as 1) to maintain living standards while not working, 2) to prevent poverty and 3) to smooth lifetime consumption. See Dekkers et al. (2009, 1) for a discussion on pension adequacy. In this paper, however, the analysis focuses on the at-risk-of-poverty rate of pensioners and/or the unemployed.

[3] The versions of both models used in this paper are those used for the 2012- report of the Study Committee on Ageing (High Council of Finance 2012), for which the team "Social protection, demography and prospective" of the Federal Planning Bureau produces and simulates the various scenarios.

be briefly presented in section 4. But the impact of the unemployment reform on pension adequacy (and vice versa) is at best indirect, namely via changes of the poverty line and via the impact of the unemployment benefit on the equivalent household income of pensioners – and hence only for households made up of both pensioners and unemployed persons. Those indirect effects are less relevant for the analysis, but distort the picture in that it is very difficult to discern the impact of both reforms when they are simulated jointly. To exclude those indirect effects, this paper considers the impact of the reform of the pension system (including conventional early leavers' scheme) on the poverty risk of pensioners only, while the impact of the reform of the unemployment and career break schemes is expressed in terms of its impact on the poverty risk of the unemployed only.

Section 2 of this paper describes the recent social security reform in Belgium. The two models used to estimate the budgetary and social impact of the reform are presented in the third section. Section 4 illustrates the budgetary impact of the structural reforms while section 5 analyses the social impact of the reforms.

Since the reform is very recent, there is not much work on the assessment of its consequences to date. A recent paper by Jousten et al. (2012) is the most notable exception. This present paper aligns with theirs in the joint assessment of the impact of reform on macroeconomic aggregates, but also on individuals. Furthermore, both their and our microsimulation models are based on essentially the same administrative dataset. Their work, however, differs from ours in various respects. First of all, they use static microsimulation techniques to express the impact of reform in 'accrued to date pension rights', i.e. the discounted pension rights that would be due if the system were shut down today. This paper, on the other hand, uses dynamic macro modelling jointly with dynamic microsimulation to a forward-looking approach, taking into account the intertemporal impact of the reform and how reform changes "the future generosity of these programs" (Fernández, 2012, 78). Secondly, our approach is conceptually simpler in that we simulate the intertemporal development of the poverty risk of pensioners and the unemployed, respectively, in a scenarios with and without reforms. Thirdly and most importantly, the above study chooses to "focus on a set of hypothetical reform scenarios rather than follow the reform as recently initiated by the Di Rupo government" (Jousten et al., 2012, 22), whereas our paper pertains to the budgetary and social impacts of the recent *actual* social security reform.

2. Recent social security reform in Belgium

Belgium has a Bismarckian-style first-pillar (a.k.a. public or social security) pension system, toned down by several floors and ceilings, as well as a means-tested minimum pension benefit (an assistance scheme named the guaranteed income for the elderly). Besides this assistance scheme, there are three main separate schemes: one for wage earners (in the private sector as well as for contract employees in the public sector), another for civil servants and a third for the self-employed.

As in many countries, Belgium experiences demographic ageing, which impacts the expected cost of this pension system as a percentage of GDP (see High Council of Finances (2012) for a discussion). This situation is aggravated by the recent economic crisis, causing a slowdown of GDP and a reduction of the contribution base via a decrease in the employment rate and a slowdown in the growth rate of real wages. Furthermore, the employment rate of older workers in Belgium is very low compared to the other European Union Member States. Furthermore, there was concern about the at-risk-of-poverty rate of pensioners, at least for specific groups among them. All this resulted in three recent periods of pension reform[4].

The last important pension reform was the 1996 reform for wage earners and self-employed workers. It was discussed in Festjens (1997) and aimed mainly at gradually increasing the retirement age of women (from 60 to 65 by 2009). Early retirement (from the age of 60) was submitted to a career length condition of at least 35 years as of 2005. A "minimum claim per working year" was introduced in the wage earners' scheme.

Afterwards, the scheme of guaranteed income for elderly persons (GIEP) was reformed on 1 June 2001 with the individualization of the allowance. The basic amount of the guaranteed income has been increased significantly by various administrations since then. For instance, in an attempt to safeguard the adequacy of first-pillar pensions, the Leterme administration in 2006 increased the GIEP and the minimum claim per working year by about 14% (Whitehouse et al., 2009, 519). The impacts of these measures on pension adequacy and financial sustainability are discussed in De Vil et al. (2010) and Dekkers et al. (2012) and fall outside the scope of this paper.

After a prolonged period of political stalemate, the Di Rupo administration introduced in the law pronounced 28 December 2011 a number of measures reforming the first-pillar pension system, the unemployment scheme for older wage earners, and the general unemployment benefit system in Belgium[5]. The goal of this reform was to reduce the cost of the pension system by delaying retirement and increasing the activity rate of older workers. According to the most recent projections of the Study Committee on Ageing of October 2012, the budgetary costs of pensions[6] without the recent reform

[4] Koromzay (2004) is one of the few to directly define "reform" by making a difference with arbitrary policy changes. He defines reform as actions to take "away rents that have built up in the economic system or, to broaden the concept somewhat, to reduce or modify acquired rights" (op. cit. 1), and with the aim to improve the efficiency of resource allocation. In addition, however, we feel that this definition might be completed by adding that reform consists of at least one policy change (and likely more) and serves an explicit goal. See Schokkaert and Van Parijs (2003) and Fornero (2003) for a discussion on social justice and pension reform in Europe, and Disney (2004), O'Brien (2010) and Whitehouse et al., (2009) for a discussion on the paradigms in pension reform.

[5] Despite the somewhat exceptional political circumstances, the timing of this reform as well as the arguments to legitimate it are broadly in line with the conclusions drawn by Fernández (2012) on the basis of the study of pension retrenchments in 19 OECD countries.

[6] Together with old-age pensions, they also include survivor's pensions, the GIEP and "availability before retirement" for teaching personnel. Pensions of public companies are also taken into account.

should increase by 4.7% of GDP between 2011 and 2060. This projected growth in costs, together with an historical low participation rate of older people in Belgium, are the main motivations behind recent reforms.

This section will discuss the broad lines of the 2011 reform, including a number of amendments and complements[7]. The next sections will then assess the impacts on both financial sustainability and the adequacy of the first-pillar pension system (including conventional early leavers' scheme or CELS) and of the unemployment system.

Most OECD countries adopt three routes to reducing public pension expenditures (OECD, 2012, 30; see also Whitehouse et al., 2009): reduced indexation of benefits, increased legal retirement age and tighter rules for early retirement. The first two pathways have not been taken (yet) in Belgium; instead, policy has focused on the third pathway, reducing the possibilities for early retirement, together with adapting the rules for calculating the benefit at retirement.

The discussion of the pension reform in Belgium starts with the latter. Before 2013, early retirement was possible for wage earners and the self-employed from the age of 60 with a career of at least 35 years. With the reform, this minimum age is gradually being increased by steps of 6 months per year, until reaching 62 years in 2016. The minimum career length for early retirement also increases from 35 career years to 38 career years in 2013, and then gradually by one extra career year per calendar year, until reaching 40 career years in 2015. Before the reform, civil servants were not subject to an explicit career length condition for early retirement. The majority of them[8] now become subject to the same conditions as wage earners and the self-employed.

The second pathway pertains to adapting the rules for calculating the benefit at retirement. The pension benefit a wage earner is entitled to at retirement is a function of the career length and of average uprated past earnings. Periods of inactivity due to unemployment, disability and illness, career breaks, conventional early leavers' scheme (CELS; cf. infra) are taken into account – to a limited extent – as "assimilated periods". These periods, therefore, are added to the career length. Since there are by definition no earnings for these periods, fictitious 'assimilated' earnings are used instead. Before 2013, these were the last earnings before becoming inactive, uprated with the price index. As a result of the 2013 reform, the assimilated earnings equal the minimum claim per working year for those that are long-term unemployed or some CELS.

In the pension scheme for the self-employed, a penalty reduces the pension benefit if the self-employed retires before the age of 65. Before 2013, a self-employed retiring at 60, the earliest age at which early retirement is possible, lost 25 percent of its pension benefit. If one retired at a later age, the penalty was lower, 18 or 12 percent. From 2013 onward, this penalty is abandoned for self-

[7] Detailed transitional measures, even though included in the models, will not be discussed. They might, however, be mentioned later if relevant in explaining simulation results.

[8] Specifically, this concerns civil servants in the regime "with tantième 1/60". The other regimes of civil servants are also subject to reform, but with other transitional periods and career length conditions.

employed of at least 63 with a long career in any pension system. Furthermore, for the others, the reduction tariff or penalty is reduced[9].

A first measure in the pension scheme for civil servants is a standardization of the categories that fall outside the general scheme. Before the reform, specific categories such as university professors, catholic priests and magistrates were subject to specific rules pertaining to the accrual rate of the pension benefit, or the number of career years after which the full retirement benefit was reached. These specific categories now fall under the general scheme, albeit still with a higher accrual rate.

Secondly, the pension benefit of all civil servants under the age of 50 on 1 January 1 2012is no longer based on the average earnings over the last 5 years before retirement, but on the last 10 years instead. This is so unless the pension benefit resulting from the latter wage-base falls under a predetermined minimum.

Thirdly and analogously to wage earners, the system of 'assimilated periods' in the pension scheme for civil servants also changed. The general rule that assimilated periods cannot exceed 20 or 25 percent (depending on age) of the active periods is maintained. However, possibilities for assimilated periods are extended for those aged 50 and older. Finally, an overall cap of 5 years is introduced, except for 'thematic' career breaks (parental leave, care for a seriously ill relative and palliative care).

In this paper, we consider the pension reform in a broad sense, including the reform of the "prepension" or conventional early leavers' scheme (henceforth CELS). This is a full-time or part-time unemployment scheme for older wage earners of the private sector in which recipients receive an additional benefit from the former employer equal to least to half of the gross unemployment benefit and the net earnings (subject to a cap) in the year prior to lay-off. The 2012 reform changed the name of this system to "unemployment with company allowance" (henceforth UCA) and restricts the system's entry conditions. There is one general system and various specific systems, including one system for restructuring companies. This paper will only briefly discuss reform in the general system. Furthermore, the discussion will be limited to the system of full-time UCA, because the system of part-time CELS is suppressed by the reform. Before the reform, the standard entry condition in CELS was a minimum age of 60 and a career length of at least 35 years for men and 28 years for women, a condition which was gradually increasing to 35 years in 2028. For those with a long career of at least 38 years, access to the CELS system was possible from the age of 58. As a result of the reform, the minimum age for entry into the UCA increased to 60 and the minimum career length went up to 40. Specific entry conditions for those with long careers are abolished.

The unemployment scheme has also been reformed. This scheme discerns three categories of unemployment: cohabiting with dependants ("chômeurs cohabitants avec charge de famille"), cohabiting without dependants ("chômeurs cohabitants sans charge de famille") and single ("chômeurs isolés"), as well as three periods of unemployment. Each period has a corresponding replacement rate, and period lengths depend on the career length before becoming unemployed. The first period of unemployment corresponds to the highest replacement rate and the third period to a minimum benefit.

[9] The Di Rupo government has since then decided to abandon this penalty system altogether from 2014 onward. As this was unknown at the time of implementing and simulating the reforms, the impact of this decision was not taken into account.

Among the three unemployment categories, cohabiting with dependants and singles are more affected by the reform than the cohabiting. Indeed, while cohabiting already before the reform faced a reduction over time of their unemployment benefits (through the third period of unemployment), the two other categories never entered the third period, which means they benefited from an unlimited second period of unemployment. The reform introduces the third period of unemployment for all unemployed categories and reduces the lengths of the first and second period. The impact of this reform is therefore less important for the cohabiting persons than for cohabiting persons with dependants and singles: while the former face only a reduction of their unemployment benefit sooner than before, the latter two now face a reduction over time of their unemployment benefits, decreasing towards a lump sum benefit in the third period.

3. Simulating the impact of social security reform: a tale of many models

There are plenty of studies that simulate the impact of various reforms in social security and specifically pensions; see, for example, Zaidi and Grech (2007) for an overview. Martín and Marcos (2008) discern two methodological approaches to the analysis of the impact of pensions and pensions' reform[10]. The first is "aggregate accounting" or the modelling of expenditures on the basis of hypotheses and assumed demographic developments. This approach focuses on the financial sustainability of pension systems. See De La Fuente and Doménech (2013) for a recent application. The above-described social security reform has an impact on the system's budgetary costs, but might also affect its impact in reducing or preventing income poverty, since the two aspects are two sides of the same coin. The assessment of the budgetary impact of reform may therefore not be very meaningful without considering current or prospective developments in poverty risks, and vice versa.

The second strand of literature uses Computable General Equilibrium Models (henceforth CGE), mostly to assess the redistributive impact of pensions (reform) between groups of individuals or households that differ by some key characteristics, usually gender, race, level of education, sometimes region. Within-group inequality is assumed constant. Among others, Kraev and Akolgo (2005) and Savard (2005) make the case for using CGE in redistribution assessment. But CGE also has some problems. First of all, the restriction that all redistribution occurs between groups only limits, of course, the information value of the impact of the system or its changes (Vos and Sanchez, 2010, 8). Moreover, analysing redistributive impacts on the basis of representative agents "can hide unexpected effects from certain combinations of individual characteristics that could not be apprehended through 'typical cases' (Bourguinon and Spadaro, 2006, 78). Finally, one may question the degree to which the representative agents actually represent society as a whole (Martín and Marcos, 2008, 78).

As a reaction to this, a third strand of literature emerged, combining a macro-level model with a microsimulation model. There are numerous studies that combine static microsimulation models with static CGE (see Bourguignon et al., 2010, and Colombo, 2010, for an overview and discussion and for the various papers of this special issue of the International Journal of Microsimulation for applications). In dynamics, such micro-macro combinations are uncommon and do not focus on pensions or pension reform (for an overview, see Bourguignon and Spadaro, 2006; 97). The paper by Buddelmeyer et al., 2012 is a recent example of a static-ageing technique used to adapt the microsimulation model to the macro-level data for projected periods using static ageing.

The goal of the current paper is to assess the budgetary and social consequences of pension reform in an ageing society. This obviously requires a dynamic modelling approach. The usefulness of the aforementioned static-ageing approach for the analysis of Bismarckian-style pension systems is limited, since the reweighting technique does not allow for the intertemporal interdependence of events, so where an event happening in, say, 2020 may have an impact on pension income in 2040. This is very difficult to achieve via a static ageing technique, while it is a natural consequence of a dynamic ageing technique in microsimulation, where transition probabilities are used in a stochastic

[10] This discussion follows them in not including the discussion of fixed-ratio models and econometric models, because it would take us too far. See Kraev and Akolgo (2005) for a discussion.

simulation applied to change the characteristics of individuals in a cross-section dataset[11]. This paper therefore jointly uses a macro-model to assess the budgetary consequences of ageing and pension reform, and a dynamic-ageing microsimulation model to simulate the impact of this reform on the poverty risk of the elderly specifically. This is done by combining the macro model with the micro model, through adapting the latter to the simulation results of the former. Both models as well as the channels of consistency by with this adaptation is done, are to be presented now.

This paper builds on earlier work. A previous study made an assessment of pension adequacy consistent with the projections of the Ageing Working Group (AWG) in an international comparative perspective (Dekkers et al., 2010). More recent work (De Vil et al., 2010; Dekkers et al, 2012, Study Committee for Ageing, 2012, and this paper) apply a semi-aggregate model and a dynamic microsimulation model in simulating the impact of pension reform, thereby jointly assessing the budgetary consequences as well as the impacts on poverty and income inequality among the elderly in Belgium.

The model used to assess the budgetary consequences of ageing and pension reform is MALTESE[12]. This is a composition of interdependent semi-aggregate models around one central model. The global accounting frame of the system relies on the national accounts. The various models are accounting models designed for translating demographic projections into budgetary developments such as social security account and overall public finance account. Special attention is paid to modelling social expenses according to the calculation rules (legislation), often by scheme, gender, age and categories for the number of beneficiaries (new and other) and the corresponding average benefits. The latter take into account ceilings, minimum rules, indexation rules, et cetera.

Pension adequacy is assessed through the dynamic microsimulation model MIDAS. Technically speaking, MIDAS is a dynamic population model with dynamic cross-sectional ageing. Starting from a cross-sectional dataset representing a population of all ages at a certain point in time, the model simulates the life spans of individuals in the dataset, including their interactions through household formation and dissolution, for the years between 2002 and 2060. The latest version of the model used here is being developed, tested and validated on a dataset of 300,000 individuals. The actual simulation runs are based on an expanded[13] version of this dataset, including 2.2 million individuals or one fifth of the Belgian population (de Menten et al., 2012).

Summarizing, whereas macro simulation considers averages, a micro simulation model attempts to take into account the heterogeneity behind the average. This allows capturing the complex interactions of government policies with the distribution of individuals and households.

Now, a joint assessment on the basis of both models requires that they are capable to produce consistent simulations. MIDAS has an extensive alignment procedure, which allows it to be consistent with exogenous semi-aggregate projections and assumptions.. The methodology used is known as "alignment by sorting" (Li and O'Donoghue, 2014). This procedure separates the a priori risk for an

[11] See O'Donoghue (2001) and Dekkers (2011) for a discussion on these simulation techniques and some applications.

[12] This discussion is based on section 2.2.3. of Dekkers et al. (2010), and Fasquelle et al. (2012)

[13] The expansion process of an individual with frequency weight f involves creating (f-1) copies or clones of this individual. This way, the size of the dataset increases as frequency weights are absorbed. See Dekkers and Cumpston (2012) for a more extensive discussion.

individual to be in a specific state and the proportion of all individuals being in this particular state. At first, individuals are ranked according to their risk of being observed in the designated state. Next, the alignment procedure takes the first *x*%, where *x* is an exogenous deterministic mortality rate, and marks them in that state. This alignment methodology allows for various 'channels of consistency' between the microsimulation model MIDAS and the semi-aggregate model MALTESE. A first channel of consistency is that both models use the same demographic projection. A second channel of consistency is that MIDAS uses alignments to adapt the proportional sizes of labour market states (number of people working in the private sector, public sector, as a civil servant, or as an independent worker) or social security category (unemployment, disability pension beneficiary, CELS beneficiary, old-age pensioner). A third channel of consistency is that MIDAS adopts the development from MALTESE. A fourth and final channel of consistency is that both models use a common social policy hypothesis. All channels are shown in Figure 1.

INSERT FIGURE 1 ABOUT HERE

Figure 1: channels of consistency between MIDAS and MALTESE

Figure 1 shows the relations between the various models. The scheme is loosely based on the notation used in the Interaction Flow Modeling Language (IFML, 2014) . The hexagones denote "actions", in this case models. The rectangles denotes an "interface element" that provides input to the models. Finally, the arrows denote input-output dependencies, that is a situation where the output of one model is the input of the other. The black arrows reflect parameter changes, while the large arrows denote (changes of) numbers of individuals in various states.

The interaction starts with MALTDEMO, which produces demographic projections (Federal Planning Bureau et al. (2011)). A first input of both MIDAS and MALTESE – and a first channel of consistency between them - pertains to demographic information. Starting from a detailed population database, the population projection rests on three demographic assumptions: fertility rate, life expectancy at birth and net migration flow (see Table 1 for an illustration of the main assumptions of the long-term base scenario). The resulting numbers of individuals specific to gender-age groups, are a starting point in MALTESE (cf. infra). Furthermore, fertility and mortality probabilities are the point of departure for the alignment procedures in MIDAS.

Having projected labour market participation rates and the size of the labour force by a cohort approach, the macroeconomic scenario is then elaborated using the structural model S3BE ('Small Supply-Side model for the Belgian Economy'). Assuming a CES production function[14] with labour and capital as inputs, labour-augmenting technical progress and constant returns to scale, past trends in labour market efficiency gains are used to compute the evolution of the structural unemployment rate. Next, given the unemployment rate trajectory, the development in the labour force and an assumed total factor productivity growth, employment and Gross Domestic Product (GDP) are determined simultaneously (Lebrun, 2009). These are inputs for the MALTESE model, which then uses a cohort approach to split the given population projection into the school population, the labour force, the disabled persons and the others (as a residual), by gender and age. This breakdown is based on transition probabilities and behaviour in recent years and includes impacts of reforms. See Fasquelle et al. (2012) for a detailed discussion. The population is then further subdivided into labour market states (employment by schemes, unemployment, full-time career breaks, CELS/UCA) and inactive states such as retirement. This subdivision is specific for age and gender categories. Through the aforementioned alignment techniques, the microsimulation model MIDAS replicates the resulting proportional sizes of the various labour market and social security categories tables, also specific to age and gender[15]. This is the second channel of consistency between both models.

[14] CES stands for "Constant Elasticity of Substitution". This is a neoclassical production function, where technological change results in a constant percentage change in factor proportions. Thus, the marginal substitutions of the factors are constant.

[15] Note that the number of hours worked by the working population is simulated independently in MIDAS. Thus, the assumption here is that pension reform may affect labour supply at the extensive margin directly, but that supply at the intensive margin will remain unaffected. This is consistent with a central finding in the empirical labour market literature (Immervoll et al., 2007, 3).

A third channel of consistency pertains to the development of wages in both models. MALTESE uses the exogenous productivity development to simulate earnings growth. MIDAS uprates the earnings on the micro-level in such a way that the productivity growth rates used in MALTESE are replicated for men and women separately. As a result, both MALTESE and MIDAS adopt the actual development of wages between 2002 and 2011, and the mid-term projections 2012-2017 of the Federal Planning Bureau (2012). For the years up to 2018, the joint assumption is that the average wage growth rate converges gradually to its long-term level, which is 1.5% p.a. (see Table 1).

Table 1Main assumptions underlying the simulations of MALTESE and MIDAS

Demographic assumptions ("Population projection 2011-2060")

	2011	2030	2060
Fertility rate	1.84	1.86	1.86
Life expectancy at birth: men	78.2	81.9	86.2
Life expectancy at birth: women	83.4	85.8	88.8
Net migration flow in thousands	63.0	23.4	31.9

Socioeconomic assumptions

Education rate	Maintained at the level of the most recent observations for those under 15 and a function of the evolution of the participation rate of those 15 and older in the labour market
Participation rate and transition from active status to disability, unemployment with company allowance (UCA) and retirement	Modelling which applies to the successive generations probabilities of transition from one socioeconomic category to another, by gender and age group, and taking into account the effects of the already approved reforms

Macroeconomic assumptions

Mid-term	Long-term base scenario
Following the "Economic Forecasts 2012-2017" of the FPB where:	
Productivity growth between 2011 and 2017: 0.8% per year	Productivity growth 1.50%
Unemployment rate in 2017: 11.9%	Structural long-term unemployment rate 8.0%
Employment rate in 2017: 65.4%	

Social policy assumptions

2011-2012:	From 2015	
Existing legislation (measures of the social partners and the government)	Wage ceiling Minimum claim per working year	1.25%
	Non flat rates (general scheme)	0.50%
2013-2014:	Flat rates and minima	1.00%
Governmental agreement of December 2011		

Source: High Council of Finance, Study Committee for Ageing, Yearly Report 2012

Finally, a fourth and final channel of consistency between the two models is introduced via the use of common social policy hypotheses on the intertemporal development of social security benefits and the various parameters, minimum benefits, floors and ceilings (see Table 1). See, among other, Dekkers et al. (2012) and De Vil et al. (2010) for a more extensive discussion.

Though much effort has been put in the consistency between the two models, some fundamental differences between the two remain. They pertain to the level of modelling and the initial datasets. The semi-aggregate model MALTESE is based on a variety of meso- and macro-level data, including national accounts data. The microsimulation model, on the other hand, starts from a representative administrative sample of 300,000 actual individuals and their households, including their interactions; a dataset which is then extended using the sample weight to a sample of about 2.2 million individuals in 2001. Thus, especially in the short- and middle-term, where simulation results are more the result of the initial dataset and less of the models themselves, the observed trends may differ.

4. The budgetary impact of the structural reforms

The budgetary impact of the structural reforms is assessed by the MALTESE system of models which started to be developed in 1987 by the Belgian Federal Planning Bureau, at the request of the government. This model allows to produce long-term social expenditure projections within the overall framework of public finance. Since 1987, the MALTESE system has constantly been improved. Between 1987 and 2001, it was used several times, either on the initiative of the FPB or to support economic policy-making, especially for measuring the impact of various statutory public pension reforms in Belgium in 1990 and 1996.

In 2001, the law "guaranteeing a continuous reduction in public debt and the setting up of the Ageing Fund" was passed. The goal of the Fund was to build up a demographic reserve to finance the supplementary expenses pertaining to the statutory pension schemes due to ageing for the period 2010-2030, as long as public debt was reduced to 60% of GDP. This law also initiated the creation of the Study Group on Ageing, which publishes a yearly report on the budgetary and social implications of ageing (through assessments of the budgetary cost of ageing and specific studies). The Federal Planning Bureau has been entrusted with the technical and administrative secretariat of the study group. So every year, the MALTESE system of models is applied to produce a long-term projection of all social expenditure for the yearly report of the Study Group on Ageing. Then, the department "Borrowing requirements of the Public Sector" of the High Council of Finance provides its yearly advice with recommendations for budgetary policy, based on the annual report of the Study Group on Ageing. Finally, the federal government issues an annual "Memorandum on Ageing" based on the annual report of the Study Group on Ageing and on the annual advice of the department "Borrowing requirements of the Public Sector" of the High Council of Finance.

This section presents the budgetary impact of the recent pension reform (including the early retirement reform) and the impact of other, simultaneously decided, restrictive measures with regard to unemployment benefits and access conditions for career breaks and time credit, estimated in the 2012 annual report of the Study Group on Ageing. The tables in this section illustrate, on the one hand, the evolution of the reference scenario which includes the structural reforms and, on the other hand, the impact of those reforms by comparing the base projection with a projection without reform. Besides the impact on social expenditure, the reforms also affect the labour market and the macroeconomic indicators.

4.1. Labour market and macroeconomic environment

Without the reform, the labour market hypotheses imply increasing participation and employment rates in the projection. The structural reforms reinforce this favourable development in the long run: compared to a situation without reform, the global participation rate is raised by 1 percentage point and the participation rate of the age category 55-64 by 6.2 percentage points by 2060 (Table 2). In the base projection (including the reforms), the global participation rate and the participation rate of older workers reach 74.5% and 64.9%, respectively, in 2060.

Table 2 Labour market: base scenario (with reform) and difference between projection with and without reform in percentage point.

	Base scenario (with reforms)			Impact of reforms	
	2011	2030	2060	2030	2060
Participation rate *(labour force[a] in % of population 15-64 years)*	72.7	74.2	74.5	1.0	1.0
15-54 years	76.5	75.6	75.6	-0.2	-0.1
55-64 years	52.9	64.0	64.9	5.8	6.2
Employment rate *(total employment in % of population 15-64 years)*	64.0	68.0	68.5	0.9	1.0
15-54 years	68.3	70.0	70.2	-0.2	-0.1
55-64 years	42.0	55.1	56.3	5.2	5.6
Unemployment rate *(unemployment in % of labour force[a])*	11.9	8.5	8.0	0.1	0.0
CELS/UCA rate *(% of potential labour force[b] 50-64 years)*	8.0	5.9	5.6	-1.5	-1.5

Source: High Council of Finance, Study Committee for Ageing, Yearly Report 2012

a. The labour force comprises total employment and unemployment.

b. The potential labour force comprises the labour force, those that are not working and are in CELS/UCA, full-time career breaks and time-credit.

Assuming that the reforms do not affect the structural unemployment rate (8%), employment should, in the long run, have a similar evolution as the labour force. Compared to a scenario without reform, the global employment rate is raised by 1 percentage point and the employment rate of the age category 55-64 by 5.6 percentage points by 2060. In the reference simulation, the global employment rate and the employment rate of those aged 55-64 amount to 68.5% and 56.3%, respectively.

Table 1 shows that annual labour productivity growth amounts to 1.5% in the long run in the base scenario (from about 2030 onward). However, Table 3 shows that, over the period 2011-2060, productivity gains only add up to 1.3% annually on average as a result of weaker productivity growth in the short-to-medium term. Productivity growth in the short-to-medium run is lower than in the long run, because the former is determined endogenously, whereas the latter by hypothesis equals the actual recorded productivity growth rate of 1. 5% per year between 1980 and 2008. This time period, and thus the hypothesis, intentionally excludes the crisis years after 2008. For comparison, when the period covers 1980-2010, the average productivity growth rate only equals 1.3%. Still, the hypothesis of 1.5% productivity growth rate coincides with those of international organisations, including the OECD, and of the Ageing Working Group. In addition, the actual average annual productivity growth over the period 2011-2060 will not exceed 1.3% in this scenario, since productivity starts off with a low growth in the medium run - caused by a slightly negative difference between actual and potential GDP- and will only reach the hypothetical growth rate around 2026.

Between 2011 and 2060, GDP should grow by 1.7% per year on average and employment by 0.3% per year (see Table 3).

Table 3 Macroeconomic projection: base scenario (with reform) and impact of the structural reforms (difference between projection with and without reform in %

	Base scenario (with reforms)			Impact of the reforms				
	Average annual growth rates in real terms in %						Level in %	
	2011-2030	2030-2060	2011-2060	2011-2030	2030-2060	2011-2060	2030	2060
GDP	1.6	1.7	1.7	0.07	0.00	0.03	1.3	1.4
Productivity	1.1	1.5	1.3	0.00	0.00	0.00	0.0	0.0
Employment	0.5	0.2	0.3	0.07	0.00	0.03	1.3	1.4

Source: High Council of Finance, Study Committee for Ageing, Yearly Report 2012

In the long term, employment growth owing to structural reforms implies an economic growth which is slightly higher than in a scenario without reform: 0.03% annually over the period 2011-2060 (see Table 3). In 2060, GDP should be 1.4% higher than in a scenario without reform.

4.2. Social expenditures

The next table presents the budgetary cost of ageing, or the variation of the whole social expenses expressed in percent of GDP between two years, firstly for the base scenario which includes the reforms (left column of the Table 4). In the base-scenario, social expenses should rise from 25.3% of GDP in 2011 to 31.4% of GDP in 2060, or a budgetary cost of ageing of 6.1 percentage points of GDP between 2011 and 2060. The costs of pensions and health care should increase by 7.6 percentage points of GDP, but the other expenditures (especially for unemployment benefits and child benefits) should decrease by 1.5 percentage points of GDP. The decrease in the other expenditures results, on the one hand, from a reducing number of beneficiaries (especially in the unemployment scheme due to the decrease in the unemployment rate in projection) and, on the other hand, from the social policy assumptions which present a partial adjustment of the social allowances to living standards (see Table 1). Pension expenditure should increase by 4.6 percentage points of GDP between 2011 and 2060, which is not surprising given the rise in the demographic dependency ratio. This relates people aged 65 and more to the population aged 15-64 and increases by 62% between 2011 and 2060. Public health care expenditure (acute and long-term care) should increase by 3 percentage points of GDP between 2011 and 2060, the ageing population having an impact on those expenses and especially on long-term care.

Table 4 Budgetary costs of ageing: scenario with reform and impact of the reforms (difference between projection with and without reform)
% of GDP

Components of the budgetary costs	Base scenario (with reforms)				Impact of reforms	
	2011	2030	2060	**2011-2060**	2011-2030	**2011-2060**
Pensions	9.9	13.6	14.5	**4.6**	-0.2	**-0.1**
- wage-earners	5.4	7.6	7.8	**2.5**	-0.2	**-0.1**
- self-employed	0.8	1.0	1.1	**0.3**	0.0	**0.0**
- civil servants	3.7	5.0	5.6	**1.8**	-0.1	**0.1**
Health Care[a]	8.0	9.4	11.0	**3.0**	0.0	**0.0**
Disability schemes	1.6	1.6	1.5	**-0.1**	0.0	**0.0**
Unemployment[b]	2.0	1.3	1.1	**-0.9**	-0.1	**-0.1**
CELS/UCA	0.4	0.3	0.3	**-0.2**	-0.1	**-0.1**
Child benefits	1.6	1.6	1.4	**-0.2**	0.0	**0.0**
Other social expenditures	1.7	1.7	1.6	**-0.1**	0.0	**0.0**
Total	25.3	29.5	31.4	**6.1**	-0.5	**-0.3**

Source: High Council of Finance, Study Committee of Ageing, Yearly Report 2012
a. Public expenditure, including long-term care.
b. Including time credit and career breaks

The impact of the structural reforms on the budgetary costs of ageing is further discussed by comparing the budgetary costs of ageing in percent of GDP with and without reform (right column of Table 4). The structural reforms of December 2011 reduce the budgetary cost of ageing by 0.3 percentage point of GDP between 2011 and 2060, evenly distributed between pensions, unemployment and CELS/UCA. Besides the direct impact of the measures themselves, the increased GDP that results from the reform decreases, of course, the weight of social expenses in percent of GDP.

4.2.1. Unemployment, career breaks and conventional early leavers' scheme

The average benefit level of the CELS/UCA is unaffected by the reform. The decrease in expenses due to the reform therefore comes from the reduction of the number of CELS/UCA beneficiaries: in 2060, almost 22,000 people, or 18% of the number of beneficiaries without reform, should not have access to this regime anymore, be it temporarily of definitively. Expenditure for unemployment and career breaks should also drop by 0.1 percentage point of GDP, as a result of, on the one hand, more strict access conditions for career breaks which lower the number of eligible persons, and, on the other, a decrease of average benefits due to the more outspoken decrease of the unemployment benefit with increased duration of the unemployment spell, and to the raised eligibility age for a seniority supplement.

4.2.2. Pension schemes

Table 4 shows that the impact of the reform should reduce pension expenses by 0.1 percentage point GDP between 2011 and 2060 only. Of course, the reform results in a decrease in the number of pensioners (almost 66,000 people in 2060 or 1.7% of the total number of pensioners) which reduces

pension expenditures in terms of GDP. Inversely, however, these expenditures themselves are increased by higher average pension benefits.

During the transition period, expenditure reductions are made in the three pension schemes by a drop in the number of retirements, as career and age conditions are raised progressively until 2016. Civil servants are to postpone their retirement for a relatively longer period since, contrary to wage earners and the self-employed, they previously were not subject to a condition for early retirement. When the people who initially had to postpone their retirement actually will retire, they will receive a higher average pension benefit, mainly because of a longer career compared to the situation before the reform. The extent to which the average pension increases and whether these two effects cancel each other out, differs between schemes. On the whole, expenditures in the wage earners' scheme are reduced, but in the self-employed scheme and especially the public sector, expenditures grow compared to a scenario without reform.

a. Wage earners' scheme

In the wage earners' scheme, the increase of average pensions – as a result of longer careers – amply compensates for the negative impact of the less favourable valuation of certain assimilated periods. Furthermore, the hypothesis that the modalities of the current pension bonus[16] are maintained until the end of the projection period leads to a higher bonus and, thus, to a higher average pension. Meanwhile[i] the government has reformed the pension bonus to tune it to the pension reform, thereby only granting a bonus one year after the career condition for early retirement is met and work is continued.

b. Self-employed scheme

In the self-employed scheme, the increase of average pensions should more than compensate for the savings resulting from the smaller number of pensioners, owing to longer careers and a higher pension bonus (see also wage earners' scheme) in the longer term, and lead to additional expenditure. Particularly in the self-employed scheme, career extension leads to a higher number of, mainly female, pensioners who meet the conditions for a minimum pension, which in its turn raises the average pension. Moreover, the increased flexibility of the penalty system contributes to higher average pensions for new pensioners. By 2060, pension expenditure for the self-employed should be 0.5% higher than in a scenario without reform. But when expressed in percentage of GDP, as shown in Table 4, this increase is cancelled out. During the process, the government decided to reform the pension bonus for the self-employed, brining it in accordance with the system in the wage earners' pension scheme.

c. Civil servants' scheme

Additional expenditure by the year 2060 is also projected in the civil servants' scheme: 3.7% more than in a scenario without reform, or 0.1 percent point if GDP growth is taken into account. Compared to wage earners or the self-employed, civil servants are to postpone their retirement for a longer period

[16] A pension bonus of € 2.2 (prices on 1/2/2012) per day of actual service is granted to wage earners and the self-employed which continue to work after the age of 62 or after a career of at least 44 years. According to the law, the bonus entered into effect on 1/1/2007 and ends on 1/12/2013.

because of insufficient career years. This career extension leads to a higher average pension. Moreover, as a result of retirement at a higher age, more pensioners benefit from a (higher) age supplement[17]. This age supplement is responsible for almost 50% of the additional expenditure compared to a scenario without reform. It may therefore come as no surprize that in the meantime the government has decided to abolish this age supplement for civil servants and replace it by the same pension bonus as in the general scheme for wage earners and the self-employed.

5. The social impact of social security reform

This section starts with a caveat. The figures below show the impact of pension reform on pensioners and of unemployment reform on the unemployed. The change of a benefit, however, affects the equivalent income of the household of the beneficiary and therefore changes the poverty risk of all the members of the household. As Figures 2 and 3 show the impact of pension reform for pensioners and Figure 5 the impact of unemployment reform for the unemployed, both figures ignore the indirect impact on non-beneficiaries. We have however chosen to limit the discussion to beneficiaries in order to present the impact of the reform measures graphically.

5.1. Impact of pension reform on the poverty risk of the pensioners

The recent social security reform is mainly a pension reform. This section will therefore analyse the impact of this reform on pension adequacy first. The main indicator analysed is the risk of poverty rate of retirees. The global impact of the reform can be seen in Figure 2. The risk of poverty rate of retirees decreases progressively as a result of the reform. In 2060, the reduction should reach 4 percentage points. The progressivity of this reduction indicates that the impact of this reform on poverty operates mainly in the long run.

Finally, the small discontinuity in 2023 in the scenario without reform is due to the impact of the medium-term wage growth rate on the poverty line. As the wage growth rate differs between scenarios in the medium run, this small peak appears one year later in the scenario with reform.

INSERT FIGURE 2 ABOUT HERE

[17] Since 1/1/2001, an age supplement is granted to civil servants who continue their career after the age of 60. The age supplement increases with the age and amounts to 1.5% of the pension for retirement at 61, running up to 9% of the pension for retirement at 65.

Figure 2: Risk of poverty rate of retirees – Comparison between a scenario with structural reforms and a scenario without structural reforms, in percent

Source: own calculations using MIDAS

Figure 3 presents the impact of the reform on the poverty risk of retirees differentiated by gender. For men, the decrease in poverty rate appears immediately after the introduction of the reform. With more restricted eligibility conditions for early retirement, individuals are stimulated to postpone retirement. Consequently, as career length increases, retirement benefits do so as well.

In 2060, the poverty rate reduction of retirees should reach almost 4 percentage points for men and almost 5 percentage points for women. Even if this decrease is slightly higher for women in absolute terms, the decrease is largely more important for men (-50%) than for women (-30%) when we consider the variation of poverty in relative terms.

Finally, Figure 3 shows that the reduction of the poverty risk as a result of the reform sets off almost a decade later for women than for men.

INSERT FIGURE 3 ABOUT HERE

Figure 3: Risk of poverty rate of retirees by gender – Comparison between a scenario with structural reforms and a scenario without structural reforms, in percent

Source: own calculations using MIDAS.

Figure 4 allows for a better understanding the various impacts of the pension reform. Its left panel presents the evolution of the average retirement benefit by gender, while its right panel shows the evolution of the average equivalent income of pensioners by gender. The differences observed in the right panel of Figure 4 obviously result from single male and female pensioners, as well as from pensioners whose partner is not retired. That the differences in the long run are more outspoken in the left than in the right panel is due to the redistribution of the impact of the reform between household members. The comparison of these two figures allows, in addition to explaining the evolution of poverty rates, to understand the role of household composition and income composition in households. To facilitate the discussion of Figure 4, it is useful to discern between three groups of workers. Those with very short careers and those with very long careers are for opposite reasons unaffected by the reform: the former because they do not meet the requirements for early retirement before as well as after the reform, and the latter because they do. The first group consists mainly of women, whereas men are predominant in the second group. It is the third group, consisting of workers with a 'middle' career length that have to postpone their retirement because of the reform. Next, we turn to the discussion of Figure 4. In stark contradiction to men, both the average retirement benefit and the average equivalent income decrease for women in the years following the introduction of the reform. Even if this reform incites people to work more, wage-earners and the self-employed who were not eligible for early retirement before the reform are by definition not impacted by the reform, since this makes the conditions for early retirement stricter. They therefore continue to work, as in the situation without the reform, until the normal retirement age of 65. As mentioned before, women are proportionally overrepresented in this group. Therefore, during the years directly following the

introduction of the reform and compared to the situation without reform, as only women with mid-length careers are forced to postpone their retirement as a result of the reform, those female wage-earners and self-employed who do enter retirement at 65 are mainly those with short careers. This overrepresentation leads to lower retirement benefits for newly retired women in the reform scenario and in the short run.

INSERT FIGURE 4 (LEFT AND RIGHT PANEL) ABOUT HERE

LEFT PANEL: AVERAGE PROPORTIONAL CHANGE OF RETIREMENT BENEFIT BY GENDER

RIGHT PANEL: AVERAGE PROPORTIONALE CHANGE OF EQUIVALENT INCOME BY GENDER

Figure 4: Average net retirement benefits of pensioners, by gender (left panel) and average net equivalent income of pensioners, by gender (right panel), difference with scenario without reform in percent.

Source: own calculations using MIDAS

The selection effect in the short run, where mainly women with a short career remain unaffected by the reform whereas others postpone retirement, results in the somewhat paradoxical situation in which the average female career length decreases while the average female retirement age increases. This has a negative effect on the average net retirement benefit of female pensioners and thus reduces their equivalent income.

For men of various subsequent cohorts, the distribution of the career length is more or less stable and high. Thus, the number of men entering in retirement from working will be lower each year as a result of the reform. For women, on the contrary, the average career length is currently considerably lower and expected to increase in time. As a result, the reform will prevent many women to enter into retirement in the short run. Those small numbers of retiring women will have careers short enough not to be affected by the reform. When the women affected by the reform will finally become eligible for retirement, there will be a catching-up and many women will enter into retirement in a relatively short time span, having considerably longer careers than their predecessors. The reform therefore has a stronger impact on women than on men.

5.2. The impact of unemployment reform on the poverty risk of the unemployed

Figure 5 compares the poverty risk among the unemployed in the reform scenario and in the non-reform scenario. Before proceeding, a caveat must be highlighted. In the current version of MIDAS, the income from savings, capital or occupational pension systems are not taken into account. As a result, the poverty threshold of 60% of the median equivalent income is lower than the 'official' poverty line that is derived from the EU-SILC data (EU statistics on income and living conditions). This reveals itself specifically in a poverty risk among the unemployed that is considerably lower in the model than resulting from the SILC data. In order to approach the actual poverty risk and therefore to be able to capture the impact of the reform of the unemployment system, the results below are based on a poverty threshold of 70% of the median equivalent income.

Figure 5 presents the impact of reform of the unemployment system on the unemployed and immediately shows that the poverty risk increases as a result of the reform, an impact which is more important for men than for women.

INSERT FIGURE 5 (LEFT AND RIGHT PANEL) ABOUT HERE

LEFT PANEL: AROP FOR MEN

RIGHT PANEL: AROP FOR WOMEN

Figure 5: Risk of poverty rate of unemployed computed at 70% of the equivalent income, by gender (men on the left and women on the right)

Source: own calculations using MIDAS.

To understand this difference in impact, one must recall the differences in reform for various categories of beneficiaries, as well as how men and women are distributed among those categories.

There are 3 types of unemployed persons: those living with dependent household members, those living with not-dependent household members and unemployed singles. Of these three categories, the first and the last are particularly affected by the reform of the unemployment system. The poverty risk of the unemployed with dependent household members and unemployed singles therefore increases considerably, whereas the impact of reform is limited for the unemployed living with non-dependent household members. Another reason for this impact is that, almost by definition, the latter category of unemployed benefits from the (unchanged) contributions of the non-dependent household members to the equivalent household income, which is not the case for the other two categories.

Official statistics from the National Employment Office ("Office national de l'emploi" - ONEM) show that men are predominant among the unemployed living with dependent-household members and among unemployed singles. Women, on the other hand, are dominant among the unemployed living with non-dependent household members. As a result, Figure 5 shows that the reform of the unemployment system has a greater impact on unemployed men than on unemployed women.

6. Conclusion

This paper discusses the impact of recent reform of the social security system, including the pension schemes, the conventional early leavers' scheme, the general unemployment scheme, on the development of sustainability and adequacy in Belgium. The impact analysis follows earlier work by Dekkers, Desmet and Inagaki (2012) in demonstrating how two separate yet consistent models can be used to assess the budgetary and social impact of social security reform.

The structural reforms of December 2011 reduce the budgetary cost of ageing by 0.3 percentage point of GDP between 2011 and 2060, evenly distributed among pensions, unemployment and CELS/UCA. Besides the direct impact of the measures themselves, the increased GDP resulting from the reform decreases, of course, the weight of social expenses in percent of GDP. Furthermore, the Belgian government introduced in the general scheme for wage earners and the self-employed a new pension bonus that is tuned with the December 2011 pension reform. Additional savings are realised in the civil servants' scheme (approximately 0.1% of GDP in the long run) because of the introduction of the new pension bonus which replaces the expensive age supplement.

The risk of poverty rate of retirees decreases progressively as a result of the reform. In 2060, the reduction should reach 4 percentage points (4 percentage points for men and 5 percentage points for women) Furthermore, the poverty risk of unemployed men in particular increases considerably.

To conclude this paper, it should be noted that more reform actions are needed for Belgium to cope with the budgetary impacts of population ageing. A recent study by the Federal Planning Bureau (Desmet, et al., 2013) has examined how possible reform measures might reduce the impact of demographic ageing on the financial sustainability of public finances. Even with a more severe career condition than today (45 years instead of 40 years for early retirement), public debt would still increase considerably in the long run. A policy mix of phasing out public debt, higher productivity growth, and increased employment and pension reforms would be required to stabilise public debt in the long run.

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[i] Program law of 28 June 2013